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Indian Standard

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Safety Requirements for Ropeways Installations Designed to Carry Persons — Quality Control

ICS 45.100

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Continuous Bulk Conveying, Elevating, Hoisting, Aerial Ropeways and Related Equipment Sectional Committee, MED 06

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Continuous Bulk Conveying, Elevating, Hoisting, Aerial Ropeways and Related Equipment Sectional Committee, had been approved by the Mechanical Engineering Divisional Council.

An aerial ropeway is a special form of transportation system where passengers/materials are carried on a tensioned wire rope supported above the ground. In ropeways handling passengers, safety, reliability, and conformance to high-quality and good industry practices are paramount for securing the safety of the users. Aerial ropeways are particularly useful in regions where the facility in surmounting natural barriers gives them a great advantage over railways or roads, both of which may need the heavy civil engineering work to secure easy gradient. They are inexpensive to maintain, pollution free, environment friendly, does not affect aesthetics, their power demand is modest, and, they are not seriously affected by adverse climatic conditions.

Nothing in this standard is intended to contravene any provisions of the statutory regulations wherever they are in force.

Composition of the Panel-1 on ‘Aerial Ropeways’ of MED 06 responsible for the formulation of this standard is given at Annex B.

This document comprises/ refers the following Standards and Documents as applicable for its meaning.

a) Safety requirements for ropeway installations designed to carry passengers
   1) Terminology;
   2) General Requirement;
   3) Ropes and its splicing, socketing;
   4) Tension device;
   5) Drive systems, other mechanical devices including carriage and grips;
   6) Electrical and electronics equipment including earthing and lightening arrestor systems;
   7) Software being used in the system inspection procedure;
   8) Wi Fi, Wireless or other communication devices and systems;
   9) Civil Engineering;
   10) Pre commissioning inspection. Maintenance and operation checks;
   11) Rescue and evacuation;
   12) Operation ; and
   13) Quality assurance.
b) Glossary of terms used in connection with aerial ropeways
   1) IS 7649
   2) IS 5228
   3) IS 5229
   4) IS 9706
   5) IS 9228
   6) IS 9595
   7) IS/ISO 9001 : 2015

Together these form the series of standards and document for design, production, installation, operation and maintenance of ropeway for carrying persons.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*) . The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SAFETY REQUIREMENTS FOR ROPEWAYS INSTALLATIONS DESIGNED TO CARRY PERSONS — QUALITY CONTROL

1 SCOPE

1.1 This standard covers the requirement for quality control of ropeway installations designed for carrying persons.

1.2 This standard provides the procedures for quality assurance and supplements the requirements of other standards mentioned in the foreword for different types of ropeways.

1.3 This is applicable to all suppliers for ropeway installation or supplying the safety components for a ropeway system. If the supplier maintains a quality management system, reference shall be made to ISO 9001.

1.4 The provisions of **4** apply in all cases.

1.5 Supplier for ropeway or its safety components who do not maintain any quality management system in accordance with ISO 9001, the provisions of this document to be considered as minimum requirements.

1.6 To facilitate the recall or investigation of safety components that threaten to endanger safety requirements and traceability is a must for all suppliers.

1.7 The requirements in this document do not replace the technical requirements in related standards for ropeway but supplement them.

2 REFERENCES

The Standards listed in Annex A contain provisions which, through reference in the text, constitute provisions of this standard. All standards are subject to revision, and parties to make agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards. Annex A gives a list of standards which may be used in the design and construction of aerial ropeways.

3 TERMS AND DEFINITIONS

The terms and definitions given in IS 7649 and the following shall apply.

3.1 Process (of Production, Assembly, Installation, Inspection, Testing) — It is the set of all the resources, such as personnel, materials, products, methods or practices or procedures required for the manufacturing, assembly, installation, inspection and testing of components.

3.2 Documentation (of Production, Assembly, Installation, Inspection, Testing) — The set of all the documents in which the production, assembly, installation, inspection and testing procedures are recorded in full detail.

3.3 Reference Designation (of a Production, Assembly, Installation, Inspection, Testing Pocess) — It is the reference number or other relevant documents referred to for the production, assembly, installation, inspection or testing procedure.

3.4 Traceability of Document — The history of implementation of all parts that are documented shall be traceable.

3.5 Specification — Documents that specify the requirements that is to be followed for implementation.

3.6 Safety Component (Class 1 Safety Components) — Any basic component or a set of components, sub-assembly or complete assembly of equipment and or any other device incorporated in the installation to ensure safety function and is identified by safety analysis is a safety component. Failure of such item by itself or failure of the item in conjunction with the failure of another component (as second fault) endangers safety of person.

3.7 Traceability in Production — It is the ability to locate all the specifications and documents relating to the component.

3.8 Traceability for Recall — The ability to identify and determine the location of the component.

3.9 Quality Plan — For the purpose of quality assurance the document defining the specific requirements for the procedures, resources, sequences to be maintained of all the activities connected with design, construction, production, inspection, transportation, installation and commissioning of safety components.

4 REQUIREMENTS FOR QUALITY ASSURANCE SYSTEMS

4.1 All components for the ropeway systems. shall be manufactured, inspected, installed, tested and maintained as per the quality plan prepared for the specific installation in accordance with **3.9**.

4.2 Product Identification and Traceability

Traceability of all safety products/components in production shall be ensured. The supplier shall introduce and follow documented procedures and regularly updated to ensure that all components (both conforming and non-conforming) have identification marks for retrieval whenever required to avoid any possible non-conformity during delivery.

4.3 Control of the Production, Installation and Customer Service Process

Supplier shall maintain all documents required for assembly and installation that includes:

a) Plan for various assembly works and the reference to the processes to be used in conformity with the standard requirements; and

b) A detailed plan in conformity with **3.9**.

5 ADDITIONAL REQUIREMENTS

5.1 General

The following additional requirements are applicable to suppliers who do not maintain a quality management system conforming to IS/ISO 9001. For all safety components for which traceability is to be ensured, a quality plan shall be prepared. It shall contain at least the following information.

5.2 Organizational Information

5.2.1 The responsibility for the individual stages of production of the safety components shall be indicated in each quality plan.

5.2.2 Each quality plan shall state details about measures taken so that the components are manufactured exactly as planned and as per specifications.

5.2.3 Quality plans shall specify all measures taken by the manufacturer to meet the general requirements defined in **4**.

5.2.4 Quality plans shall give accurate details about the content, implementation, storage and traceability of documents made for the safety components. This shall also give details of responsibility of approval and amendment of the quality plan.

5.3 The quality plan shall give exact details of the pre-operation inspection measures to be carried out after assembly and installation of the components before the cableway is made ready for operation

ANNEX A

(*Clause* 2)

LIST OF INDIAN STANDARDS RELATED TO AERIAL ROPEWAY

IS No.	*Title*
7649 : 1975	Glossary of terms used in connection with aerial ropeways and cableways (*under revision*)
5228 : 2017	Continuous movement monocable ropeways with fixed grips — Code of practice (*second revision*)
5229 : 2017	Continuous movement monocable ropeways with automatic grip — Code of practice (*second revision*)
5230 : 2017	To and fro (jig back) movement bi-cable ropeways — Code of practice (*second revision*)
16620 : 2017	Jig back movement monocable ropeways with fixed grips — Code of practice
16623 : 2017	Pulsated movement monocable ropeways with fixed grips — Code of practice
9706 : 1997	Aerial ropeways for transport of material — Construction and design — Code of practice (*under revision*)
9228 : 1979	Specification for mono seat chairs for chairlifts used in winter sports (*under revision*)
9595 : 1996	Metal arc welding of carbon and carbon manganese steels — Recommendations
IS/ISO 9001 : 2015	Quality management systems — Requirements (*fourth revision*)

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Composition of the Panel-1 on 'Aerial Ropeways' MED 06

Organizations	*Representative(s)*
In Personal Capacity	Shri A. Bhadra (***Convener***)
In Personal Capacity	Shri C. K. Karmakar
In Personal Capacity, Kolkata	Shri Dwijendra Lal Das (*Invitee*)
CSIR-CIMFR, Dhanbad	Dr Debasish Basak
CRS, Pvt Ltd, Kolkata	Shri K. Bose
Damodar Ropeways & Infra Ltd, Kolkata	Shri Ranjan Mukherjee
Usha Breco Limited, Ghaziabad	Shri Manoj Panwar

Member Secretary

Shri A. K. Mohindroo
Scientist 'C' (MED), BIS

Bureau of Indian Standards

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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